Giant Kelp (*Macrocystis pyrifera*)

Status of the Population:

The size and distribution of giant kelp beds has fluctuated greatly during the past 30 years. Kelp canopies have generally declined since1967, when the California Department conducted the first statewide survey documenting the size and distribution of kelp beds. Subsequent surveys in 1988 and 1999 found that kelp beds had declined statewide in each of those years compared to the 1967 level, with the greatest decline occurring along the mainland coast of southern California. This long term decline can be attributed to both natural disturbances such as warm water stress and intense storms associated with El NiZos and human caused disturbances. These disturbances include increased turbidity and siltation associated with coastal development, pollution, and commercial and recreational fishing activities that remove animals such as California sheephead and California spiny lobster which may help sustain kelp forests through their trophic interactions.

Oceanographic conditions have been favorable for kelp growth during the past several years; relatively cool summer sea surface temperatures were followed by mild, dry winters with relatively few large swell events. These conditions have provided for strong recruitment and a general increase in canopy area for many beds, particularly those in southern California. The Department plans to conduct another statewide kelp survey in 2002.

Home Range/Migratory Patterns:

Giant kelp ranges from approximately Santa Cruz to southern Baja California, Mexico. The offshore edge of kelp beds in turbid waters usually occurs at depths of 50 to 60 feet, while in clear water around the Channel Islands of southern California, the offshore edge of the kelp bed may extend to more than 100 feet. Given favorable oceanographic and substrate conditions, giant kelp can occur and persist throughout the nearshore environment. Occurrences of giant kelp in California are frequently controlled by wave exposure and the availability of rocky substrate.

Current Regulations:

Commercial harvesters must posses a kelp harvesting license and pay a royalty on each wet ton of kelp harvested. Harvesters are not limited in the amount of kelp which may be harvested, however no kelp may be cut below 4 feet from the surface of the water (this protects the plant's reproductive structures which are located at the base of the plant). Department designated kelp beds may be exclusively leased for a period of up to 20 years, although harvesters may not lease more than 25 square miles or 50

percent of the total kelp resource (whichever is greater). Harvesters must report the weight of all kelp harvested by date and kelp bed number. Nine beds containing giant kelp are currently closed to commercial harvesting, and the Commission may designate, through emergency regulation, any kelp bed or portion of a bed as a harvest control area where harvesting will be prohibited.

Recreational harvesters must possess a sport fishing license and may take no more than 10 pounds (wet weight) of giant kelp per day, except during the herring-roe-on-kelp season when 25 pounds may be harvested.

Under the current suite of regulations, the present level of harvesting is sustainable. In fact, from 1950 through 1980 the harvest appeared sustainable at levels nearly three times greater than those at present. Recent harvests are lower because the alginate industry has considerably reduced its demand for California kelp.

How MPAs May Help:

The long term decline in giant kelp has been linked to unfavorable oceanographic conditions, pollution, and habitat degradation (Foster and Schiel 1985). These factors are not likely to be affected by establishment of a reserve. Relatively large concentrations of sea urchins, perhaps a result of fewer predators, can also negatively impact kelp populations (North 1983, Tegner and Dayton 1991). Even so, reserves may benefit kelp by protecting species which feed on urchins such as California sheephead and spiny lobster that are the subject of intense directed fisheries. However, despite the protection offered to urchin predators in reserves urchins may still be more abundant in reserves than in adjacent areas subject to urchin harvest. Tegner and Dayton (1991) suggested that the commercial fishery for red sea urchins has helped to increase the long term stability of kelp off Point Loma. Other evidence suggests that the abundance may actually benefit kelp, by reducing the proportion of certain urchin species. In the Anacapa Island Ecological Reserve Natural Area the proportion of large red urchins to small purple urchins is higher than that in adjacent fished areas. Tegner and Dayton (1991) suggested that the commercial fishery for red sea urchins has helped to increase the long term stability of kelp off Point Loma.

Reserves may provide some benefit to portions of kelp beds which experience repetitive harvesting. Recently a small portion of a bed in Monterey County was closed due to a concern that certain plants were being negatively impacted by repetitive harvesting. Although much of the research involving the effects of harvesting on giant kelp have shown no negative long-term impacts, some studies have indicated that harvesting can reduce survivorship (Rosenthal et al. 1974) and that

repetitive harvesting (defined as four or more harvests per year) can negatively impact yield (Brandt 1923).